

REPORT NO: DCQ/NGP/2022-23/04

APPLICATION REPORT

INTERNAL COATING OF KILN INNER SHELL (LINE-3)



AT

**BIRLA SHAKTI CEMENT,
DIVISION OF KESORAM INDUSTRIES LIMITED
UNIT: VASAVADATTA CEMENT, L N NAGAR, SEDAM
DIST: GULBARGA (KARNATAKA)**

INTRODUCTION:-

DIFFCOR division of DIFFUSION ENGINEERS LIMITED successfully completed job work for internal coating of Kiln inner Shell (Line-3). This job work was carried out for our customer at Vasavadatta cement limited, Sedam. Our customer were facing problem of corrosion on internal surface of Kiln inner shell.

About Vasavadatta Cement,

Karnataka based Vasavadatta Cement was founded in 1983 and it is a part of the BK Birla Group. The company markets its products under the brand name Birla Shakti. Its marketing network is spread across Karnataka, Maharashtra, Andhra Pradesh, Goa and Tamilnadu.

Kiln shell – The steel shell of the kiln is conically tapered at the ends and can also have other tapered sections. It experiences torsion due to the drive, and flexural stress due to its own weight as well as the weight of the lining and the charge. Because of partial filling and point wise support, the ideally circular shell cross section is deformed into an oval shape. The shell is designed in accordance with the laws of thin-shell statics or by approximation methods. Direct-fired kilns are typically made out of C steel. Indirect-fired kilns, however, are to be more resistant to high temperatures, and are hence made out of a more heat-resistant alloy.



Base Metal of Kiln shell: Mild steel

Diameter: 4.55 meter

Length: 56.00 meter

Total Area: 800 sq. meters

The types of alternative fuels used in the KILN are probably the two most important in contributing factor for internal corrosion. Chlorides and sulphur originate mainly from the fuel, but in some plants can also be present either in the limestone or in the combustion air. The vapours of sulphur oxides and chlorides can leak through crack in the refractory, reach the inside of shell and produce acid condensates which can be determinant factor for internal Kiln Shell corrosion.

PROBLEMS:-

Corrosion of the rotary kiln shell behind the refractory lining has become an increasingly serious problem for cement industry as it acts silently and reduces the shell thickness to below critical structural and mechanical limits of stability of kiln shell. Understanding the factors influencing the kiln shell corrosion and its formation mechanism is the best way to inhibit it. Corrosion of kiln shell behind the refractory is influenced by a number of factors such as composition of the metallic shell and its environment, temperature of the shell, cleanliness or roughness of the shell surface, its contact with other materials and severe process conditions. Carbon dioxide and sulphur dioxide are active scaling agents of iron and steel. The main reason of shell corrosion can be attributed to alternate oxidation at high temperature and acidic reaction at low temperatures when the kiln is stopped for repairs. The corrosion phenomenon takes place mainly due to presence of oxides, chlorides and sulphide at high temperature. There are two different kinds of kiln shell corrosion are observed in cement kiln systems:

- 1- Corrosion during kiln operation resulting in scaling of the kiln shell by oxidation of the metallic iron at elevated temperature (so-called high temperature corrosion)
- 2 - Rusting during longer kiln shut downs caused by condensation or absorption of humid (moist air, water).



Fig. Corroded area of kiln inner shell

PRODUCT RECOMMENDED:-

DIFFGUARD HT:-

DIFFGUARD HT is inorganic polymeric system for very hot corrosion, resistant to SO₃, SO₂, HCL and NO_x gases, excellent performance at 450°C and resist up to 500°C.

- Superior thermal resistivity to hot flue gases in industrial facilities.
- Improved corrosion and abrasion resistance at temperature ranging from 450°C to 500°C
- Also resist to chemical and salt corrosion in external high temperature in industrial and marine environment.
- baking required for achieving properties.

APPLICATION PROCEDURE:-

A. SURFACE PREPARATION:

1. Before application of any kind of coating surface preparation is must to activate the base metal so that coating will have better bonding.
2. After manual cleaning, surface was cleaned by grit blasting to remove all the loose particles. As per ISO standard surface preparation of SA 2 ½ by blasting with surface profile was achieved of 70-80 microns.

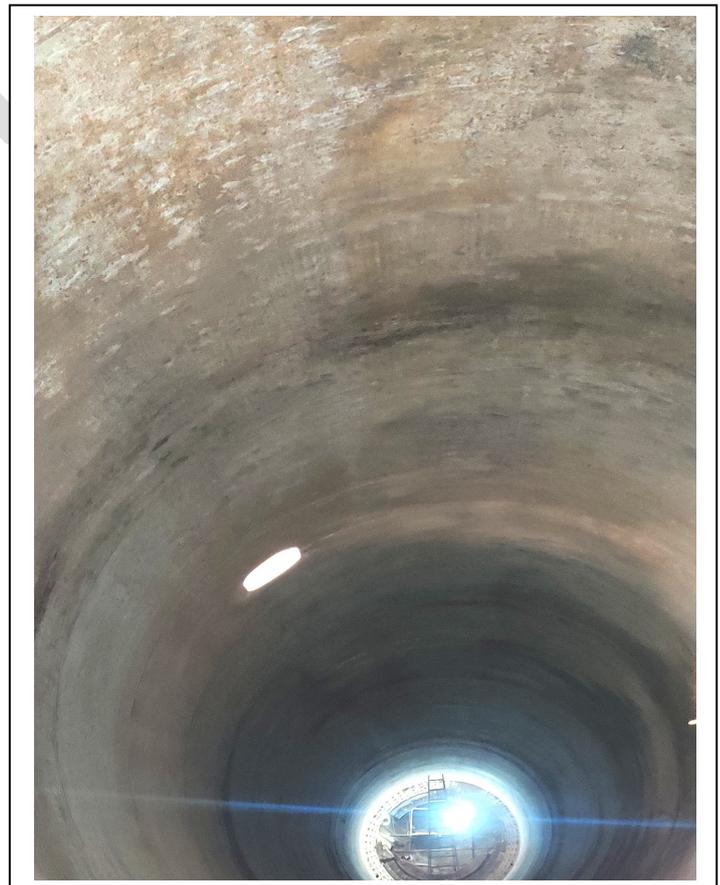
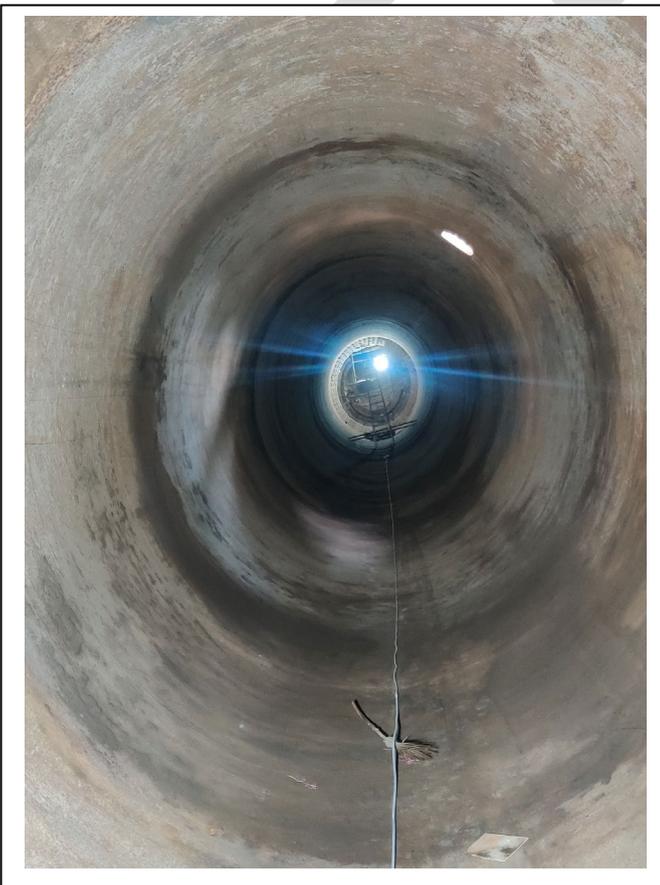


Fig. Surface Preparation done by grit blasting in kiln inner shell

B.PRODUCT APPLICATION:-

1.) After surface preparation **DIFFGUARD HT** was applied by airless spray with gun after that to increase the corrosion and Abrasion resistance.

The Dry film Thickness (DFT) was measured after final coat and reading was found @ 100-120 microns to all location of kiln inner shell.

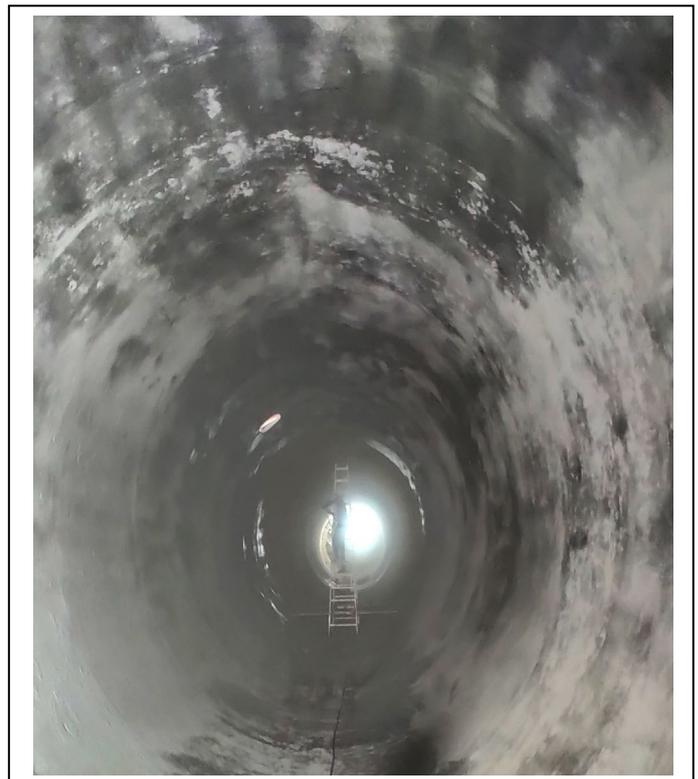
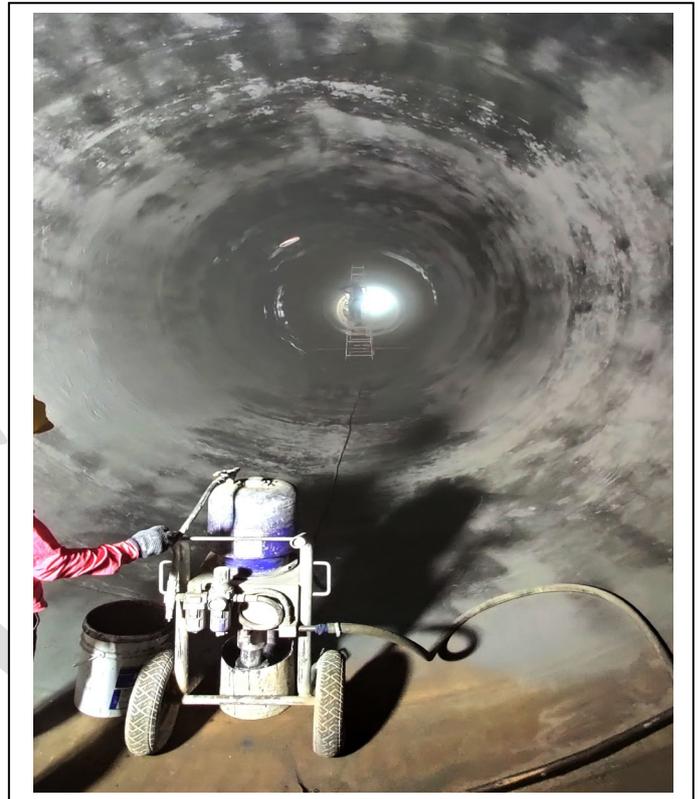
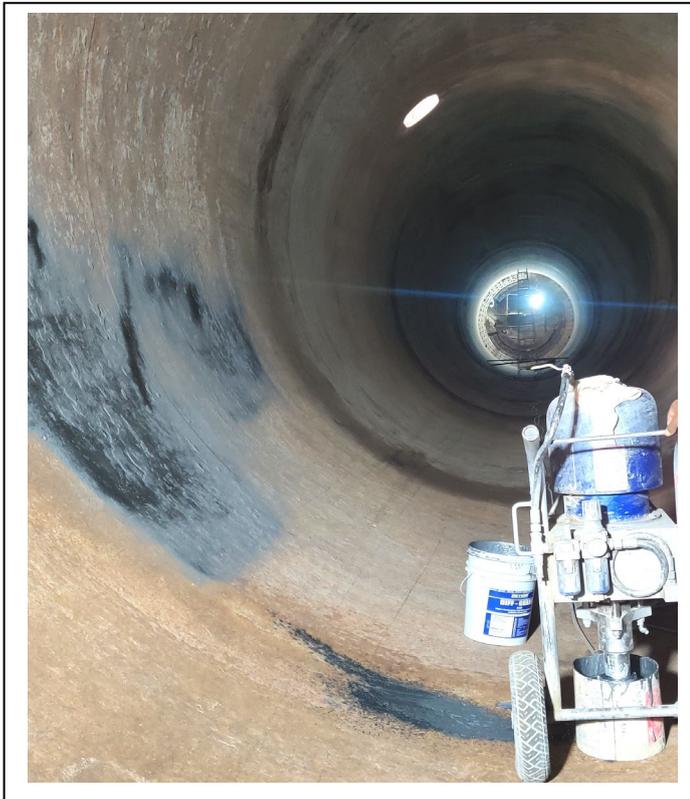


Fig. Application of DIFFGUARD HT



KESORAM INDUSTRIES LTD
CEMENT DIVISION
UNIT : VASAVADATTA CEMENT :: SEDAM



Date : 17.08.2022

Minutes of meeting between M/s Vasavadatta Cement Ltd and
M/s Diffusion Engineers Ltd, Unit - Sedam on 17.08.2022

Member Present

M/s Vasavadatta Cement Ltd

M/s Diffusion Engineers Ltd

1. Mr. Uday Mugali.

I. Mr. Santhosh Arsingi

2. Mr. Krishnamurthy. *Sukumar*

3. Mr. Sharanappa Madival *Madival*

4. Mr. Vishwanath B H

M/s Diffusion engineer reached to the M/s Vasavadatta Cement Ltd Sedam site on 21.07.22 for kiln inner shell scraping, blasting and painting as M/s Vasavadatta Cement Ltd.

Kiln Dia: 4.55 mtr Kiln Length: 56.0mt Line-3

1. Kiln inner shell scraping, blasting and painting started on 22.07.22.
2. Clean surface to remove oily, existing coating and any foreign particles.
3. Surface Preparation as per SA 2 ½ standard in which the surfaces should be grit blasted.
4. After completion of cleaning and scrapping including blasting painting started on 23.07.22
5. Application of DIFFGUARD HT by airless spray @ 100-120 microns after surface preparation.
6. Material received 225 Kgs and painting of Kiln inner shell covered 800 Sq mtrs.
7. Work completed on 25.07.22 and DEL person left the site.



ACKNOWLEDGEMENT:-

AREA ENGINEER:-

Mr. Santhosh Arsingi (Sr. Area Manager)

AGENCY INVOLVED:-

Ganpati Sales Corporation, Chandrapur

APPLICATION TEAM:-

Contractor team of Rishab Enterprises



DIFFUSION ENGINEERS LIMITED

Regd. Office & Works I : T-5 & 6, M.I.D.C., Hingna Industrial Area, Nagpur - 440 016, Maharashtra, INDIA
[t] 091-7104-232084, 234727 [f] 091-7104-232085.

Works II : N-78 & 79, M.I.D.C., Hingna Industrial Area, Nagpur - 440 016, Maharashtra, INDIA, [t] 091-7104-236036

Works III : T-12, M.I.D.C., Hingna Industrial Area, Nagpur - 440 016, Maharashtra, INDIA, [t] 091-7104-232984

[e] info@diffusionengineers.com, [w] www.diffusionengineers.com

Branches At : Chennai • Faridabad • Jamshedpur • Pune • Raipur • Secunderabad • Vadodara